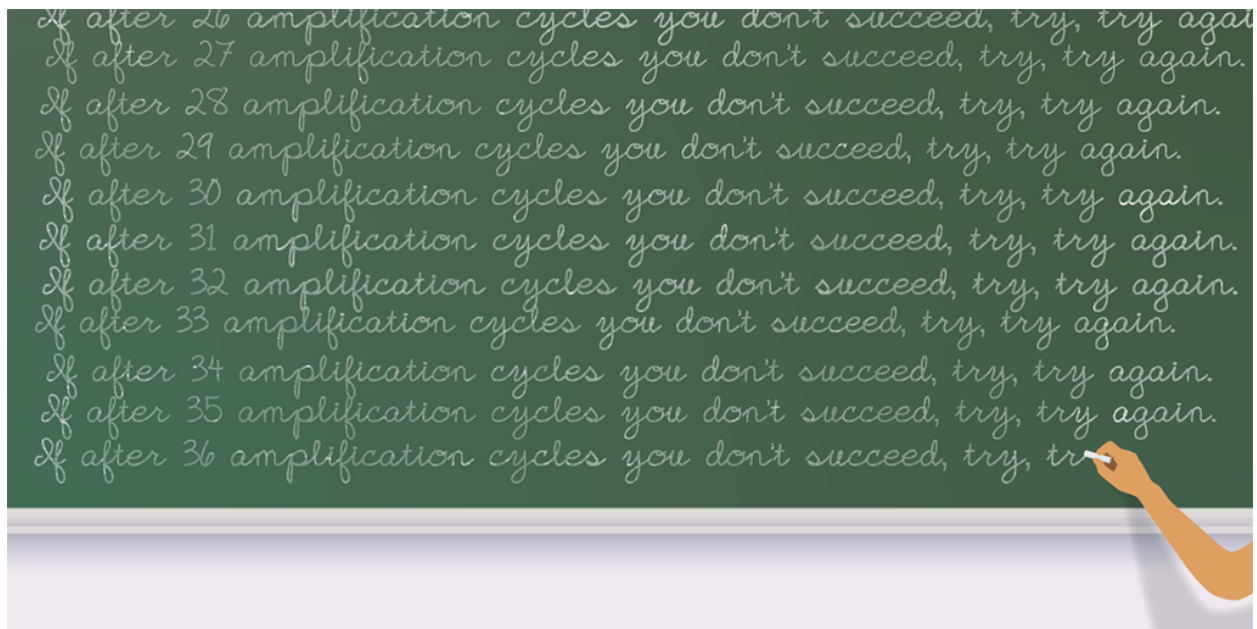


Was my PCR test result a false positive?

NOVEMBER 2, 2020 | KIM SCHIVE

MIT Medical answers your COVID-19 questions. Got a question about COVID-19? Send it to us at CovidQ@mit.edu, and we'll do our best to provide an answer.

Last week, I tested positive during routine Covid Pass testing on campus and was told to self-isolate for 10 days. My family members have all tested negative, but they are also being asked to quarantine for 14 days. None of us have had any symptoms, and we're all feeling pretty frustrated at having to put our lives on hold like this. Isn't it possible that my test was a false positive? Can't I be retested?*



We define a false positive as a test result that incorrectly indicates that a particular condition or attribute is present. By that definition, no, your test was almost certainly not a false positive. The [PCR test used by MIT](#), like other [PCR tests](#), is very [unlikely to return a false positive](#). If the test comes back positive, we can be sure that it has correctly detected genetic material from the SARS-CoV-2 virus, the virus that causes COVID-19.

But might PCR tests be too good at finding traces of the virus? That's a question scientists are starting to investigate.

The PCR test analyzes samples by amplifying viral RNA in cycles. Most tests, like the Broad Institute test used by MIT, use a 40-cycle protocol. If the virus isn't detected within 40 amplification cycles, the test result is negative. If viral RNA is detected in 40 cycles or less, the PCR machine stops running, and the test is positive. Because you received a positive result, we know that the test detected the virus in your sample by the time it reached its 40-cycle limit.

But as we learn more, this binary way of viewing test results — positive/negative, infected/not infected — may change. After all, the amount of virus in a sample is directly correlated with the number of amplification cycles needed to detect it, a number known as its cycle threshold (Ct). A positive test that comes back positive in 20 cycles contains a greater amount of virus than one requiring 40 cycles. Right now, we just call both results “positive.” But it's obvious that the first sample came from an individual with a higher viral load. And the greater the viral load, the more contagious the patient is likely to be.

There is some evidence that Ct values may be useful in predicting patients' [infectiousness](#) and [prognosis](#), but we're not yet at the point where it makes sense for us to include that information in our decision-making process at MIT, says Associate Medical Director Shawn Ferullo. For one thing, Ct values are not absolute. Different machines can produce different Ct values for the same sample, and the same machine can give different Ct values for different samples from the same person. “While it may be useful to know if an individual's Ct value is on the high or low end of the scale,” Ferullo says, “based on our current knowledge, it would not change quarantine or self-isolation recommendations.”

At this point, Ct value is not included in the test results MIT Medical receives, and we have no way of obtaining that information. “While we can't know the Ct value associated with your test or any other,” Ferullo says, “we can be pretty sure that your test result is a true positive. But it may be a subclinical case, meaning that your viral load is so low that you are not infectious and cannot spread the virus to other people, including those in your immediate household — which is a good thing!”

At the same time, Ferullo understands the frustration at being asked to put your life, and the lives of your family members, on hold. “Unfortunately, retesting is not an option,” he explains. “The Massachusetts Department of Public Health will not accept subsequent negatives to clear a previous positive test. The rules are very clear that people should not be retested once they have a positive result.”

Given our community's experience with [Covid Pass](#) testing so far, Ferullo doesn't believe subclinical positives are prevalent. “In proof of this, as of the end of October, we have done [more than 156,000 tests](#) on asymptomatic individuals through COVID Pass and have had fewer than 90 positives,” he notes. “If this was a pervasive problem, I'd expect to see many more than that.”

While Ferullo acknowledges that the test's 40-amplification-cycle protocol and binary result reporting could result in unnecessary isolation for some people, he says it's all

about keeping the Institute community safe. “While the virus has forced many universities around the country, and even here in Massachusetts, to suspend in-person activities or send students home during the fall semester, MIT has been able to maintain a monthly positive-test rate of 0.05–0.06 percent since August,” he says. “I do believe the test may be identifying some sub-clinical cases, but based on our current understanding of the virus, we’d rather err on the side of caution than put our community at risk.”

**Note: In early December 2020, the CDC announced two new options for quarantine periods shorter than 14 days for close contacts of individuals diagnosed with COVID-19 or testing positive for the virus. State and local public health authorities can choose to continue recommending a 14-day quarantine or can choose to adopt one or both shorter options. [Read more...](#)*

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